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EXAMINER

STEADMAN, DAVID J

| ART UNIT | PAPER NUMBER |
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1656

DATE MAILED: 12/06/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/713,978

Applicant(s)

YAFFE ET AL.

Examiner

David J. Steadman

Art Unit

1656

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE \_\_\_\_\_ MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☐ Claim(s) \_\_\_\_\_ is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☐ Claim(s) \_\_\_\_\_ is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date 10/20/06

- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

**DETAILED ACTION**

***Status of the Application***

- [1] Claims 1-38 are pending in the application.

***Election/Restriction***

- [2] Applicants' election without traverse of Group I, claim 1, in the response filed on 20 October 2006, is acknowledged.

- [3] Claims 2-38 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to nonelected inventions, there being no allowable generic or linking claim.

***Claim to Domestic Priority***

- [4] Applicants' claim for domestic priority under 35 U.S.C. § 119(e) to provisional application 60/426,132, filed 14 November 2002, provisional application 60/485,641, filed 8 July 2003, and provisional application 60/487,899, filed 17 July 2003, is acknowledged. The instant application is granted the benefit of priority of the provisional application(s) to the extent the provisional application(s) provide(s) support for the claimed invention. The invention appears to have been first disclosed in provisional application 60/485,641.

***Information Disclosure Statement***

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[5] An information disclosure statement (IDS) was filed on 20 October 2006. All references cited in the IDS have been considered by the examiner. A copy of Form PTO-1449 is attached to the instant Office action.

[6] If the examiner has inadvertently overlooked an IDS that has previously been filed in the instant application, applicants' cooperation is requested in alerting the examiner to this IDS in the response to this Office action.

### ***Specification/Informalities***

[7] The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed. The following title is suggested: --Computer Comprising Atomic Coordinates of a Plk-1 Polo-Box Domain--.

[8] When a sequence is presented in a drawing, regardless of the format or the manner of presentation of that sequence in the drawing, the sequence must still be included in the Sequence Listing and the sequence identifier ("SEQ ID NO:X") must be used, either in the drawing or in the Brief Description of the Drawings. See MPEP § 2422.02. To be in compliance, applicants should identify nucleotide sequences of at least 10 nucleotides and amino acid sequences of at least 4 amino acids in the specification by a proper sequence identifier, i.e., "SEQ ID NO:" (see MPEP 2422.01). See particularly Figures 2, 4, 6, 9, 11-12, and 22-31.

[9] This application contains sequence disclosures that are encompassed by the definitions for nucleotide and/or amino acid sequences set forth in 37 CFR 1.821(a)(1) and (a)(2). However, this application fails to comply with the requirements of 37

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CFR 1.821 through 1.825; applicants' attention is directed to the final rulemaking notice published at 55 FR 18230 (May 1, 1990), and 1114 OG 29 (May 15, 1990). To be in compliance, applicants should identify nucleotide sequences of at least 10 nucleotides and amino acid sequences of at least 4 amino acids in the specification by a proper sequence identifier, i.e., "SEQ ID NO:" (see MPEP 2422.01). If these sequences have not been listed in the computer readable form and paper copy of the sequence listing, applicant must provide an initial computer readable form (CRF) copy of the "Sequence Listing", an initial paper copy of the "Sequence Listing", as well as an amendment directing its entry into the specification, and a statement that the content of the paper and CRF copies are the same and, where applicable, include no new matter as required by 37 C.F.R. 1.821(e) or 1.821(f) or 1.821(g) or 1.821(b) or 1.825(d). See particularly specification at p. 8, lines 15-16 and 17; p. 9, lines 28-29; p. 10, lines 5 and 10; p. 11, line 5; p. 15, line 28; p. 16, line 17; p. 52, lines 6-7; p. 57, Table 1; p. 58, lines 16-17; 66, Table 2; p. 67, Table 3; p. 75, line 18; p. 90, line 8. See also the disclosed Table 5, beginning at specification p. 95, listing atomic coordinates representing the disclosure of an amino acid sequence.

In view of the lengthy specification, applicant's cooperation is requested in identifying other sequences that should be identified by a sequence identifier.

***Claim Rejections - 35 USC § 112, Second Paragraph***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

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**[10]** Claim 1 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 is confusing in the recitation of "at least one atomic coordinate...from Table 5 for...His-538, Lys-540, Trp-414, or Leu-491 of a Polo-box domain" as the sequence of amino acids of the structure coordinate data as set forth in Table 5 (beginning at p. 95 of the specification) does not disclose positions 414, 491, 538 or 540, disclosing instead two subunits of a Polo-box domain, each beginning with Ala at position 20 and ending with Ala at position 241. As such, it is unclear as to which amino acids the claim is referencing in referring to His-538, Lys-540, Trp-414, or Leu-491 of Table 5. It is suggested that applicant clarify the meaning of the claim.

***Claim Rejections - 35 USC § 112, First Paragraph***

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

**[11]** Claim 1 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contain subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in

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the relevant art that the inventor(s), at the time the application was filed, had possession of he claimed invention. This is a written description rejection.

Claim 1 is drawn to a computer comprising a processor in communication with a memory; said memory having stored therein (i) at least one atomic coordinate, or surrogates thereof, from Table 5 for each of the following residues: His-538, Lys-540, Trp-414, or Leu-491 of a Polo-box domain or atomic coordinates that have a root mean square deviation of said coordinates of less than 3 Å; and (ii) a program for generating a three-dimensional model of said coordinates.

In construing the meaning of the claim to determine its scope, it is noted that according to MPEP 2111.01, "[d]uring examination, the claims must be interpreted as broadly as their terms reasonably allow." The specification and claims fail to provide a specific definition for the term "surrogate." The examiner has relied upon a dictionary definition of "surrogate" in construing the claims to determine its "ordinary and customary meaning" in accordance with MPEP 2111.01. According to the Encarta Online Dictionary

([encarta.msn.com/encnet/features/dictionary/DictionaryResults.aspx?refid=1861717269](http://encarta.msn.com/encnet/features/dictionary/DictionaryResults.aspx?refid=1861717269); last visited on 16 November 2006), "surrogate" means "a substitute." Also, it is noted that the claim requires a computer comprising data of as few as "one atomic coordinate, or surrogates thereof, from Table 5 for H538, K540, W414, and L491..." (emphasis added). As such, the claim has been broadly but reasonably interpreted as encompassing a genus of computers comprising only an x, y, or z coordinate – or a

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substitute thereof – for only a single atom of each of H538, K540, W414, and L491 from Table 5.

The Court of Appeals for the Federal Circuit has held that a “written description of an invention involving a chemical genus, like a description of a chemical species, ‘requires a precise definition, such as by structure, formula [or] chemical name,’ of the claimed subject matter sufficient to distinguish it from other materials.” For claims drawn to a genus, MPEP § 2163 states the written description requirement for a claimed genus may be satisfied through sufficient description of a representative number of species by actual reduction to practice, reduction to drawings, or by disclosure of relevant, identifying characteristics, i.e., structure or other physical and/or chemical properties, by functional characteristics coupled with a known or disclosed correlation between function and structure, or by a combination of such identifying characteristics, sufficient to show the applicant was in possession of the claimed genus. MPEP § 2163 states that a representative number of species means that the species which are adequately described are representative of the entire genus. Thus, when there is substantial variation within the genus, one must describe a sufficient variety of species to reflect the variation within the genus. In this case, the specification discloses only a single species of the genus of claimed computers, i.e., a computer comprising a processor in communication with a memory; said memory having stored therein the structural coordinates of Table 5 and a program for generating a 3-D model of the coordinates. Other than this single disclosed species, the specification fails to disclose any other additional representative species of the claimed genus. However, the claims



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encompass species of computers comprising atomic coordinates of polypeptides that are structurally and functionally unrelated to the Polo-box domain of Plk-1 as disclosed in the instant specification. Thus, the genus of claimed computers encompasses species that are widely variant with respect to the structural coordinates that are stored thereon. In this case, the disclosure of the single species as noted above fails to reflect the substantial variation among the species encompassed by the genus of claimed computers.

Given the lack of description of a representative number of species, the specification fails to sufficiently describe the claimed invention in such full, clear, concise, and exact terms that a skilled artisan would recognize that applicant was in possession of the claimed invention.

**[12]** Claim 1 is rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for a computer comprising a processor in communication with a memory; said memory having stored therein the structural coordinates of Table 5 and a program for generating a 3-D model of the coordinates, does not reasonably provide enablement for all computers as encompassed by the claims. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention commensurate in scope with these claims.

It is the examiner's position that undue experimentation is required for a skilled artisan to make and/or use the entire scope of the claimed invention. Factors to be

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considered in determining whether undue experimentation is required are summarized in *In re Wands* (858 F.2d 731, 737, 8 USPQ2d 1400, 1404 (Fed. Cir. 1988)) as follows:

(A) The breadth of the claims; (B) The nature of the invention; (C) The state of the prior art; (D) The level of one of ordinary skill; (E) The level of predictability in the art; (F) The amount of direction provided by the inventor; (G) The existence of working examples; and (H) The quantity of experimentation needed to make or use the invention based on the content of the disclosure. See MPEP § 2164.01(a). MPEP 2164.04 states, “[w]hile the analysis and conclusion of a lack of enablement are based on the factors discussed in MPEP § 2164.01(a) and the evidence as a whole, it is not necessary to discuss each factor in the written enablement rejection” and that “[t]he language should focus on those factors, reasons, and evidence that lead the examiner to conclude that the specification fails to teach how to make and use the claimed invention without undue experimentation, or that the scope of any enablement provided to one skilled in the art is not commensurate with the scope of protection sought by the claims.” Accordingly, the Factors most relevant to the instant rejection are addressed in detail below.

The breadth of the claims: In accordance with MPEP 2111.01, claim 1 has been broadly, but reasonably interpreted as a computer comprising as few as a single x, y, or z atomic coordinate – or substitutes thereof – from Table 5 of only a single atom of each of H538, K540, W414, and L491 of a Polo-box domain or atomic coordinates that have a RMSD of less than 3 Angstroms, and a program for generating a 3-D model of said coordinates. The claims are not commensurate in scope with respect to the computers that are encompassed by the claim, particularly with respect to the atomic coordinate

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data stored on the computer. In this case the disclosure is enabling only for a computer comprising a processor in communication with a memory; said memory having stored therein the structural coordinates of Table 5 and a program for generating a 3-D model of the coordinates.

The lack of guidance and working examples: The specification provides only a single working example of the claimed computer, *i.e.*, a computer comprising a processor in communication with a memory; said memory having stored therein the structural coordinates of Table 5 and a program for generating a 3-D model of the coordinates. This single working example along with the general disclosure of the specification and the state of the prior art, fail to provide the necessary guidance for making the full scope of claimed computers, which encompass atomic coordinate data of essentially any macromolecule. Furthermore, it is noted that the specification fails to provide guidance for using atomic coordinate data of polypeptides other than Plk-1.

The state of the prior art; The level of one of ordinary skill; and The level of predictability in the art: The examiner acknowledges that, at the time of the invention, computers comprising atomic coordinate data for displaying three-dimensional macromolecular structures were known in the art. However, it is highly unpredictable as to whether these structures, along with the disclosed working example, enable *all* atomic coordinate data as broadly encompassed by the claims, including, *e.g.*, homology models. At the time of the invention, the level of skill in using the atomic coordinates of a homologous 3-D model with an expectation that the model maintains the conformation of a Plk-1 Polo-box domain and corresponds to a polypeptide that

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maintains Plk-1 Polo-box domain activity was low. For example, the reference of Lambert et al. (US Patent Application Publication 2004/0137518; cited in the prior Office action) acknowledges that "[p]otential or existent homology models cannot provide the necessary degree of specificity" (p. 3, ¶[0017]). Also, the reference of Flower ("Drug Design, Cutting Edge Approaches," Royal Society of Chemistry, Cambridge, UK, 2002), which, addressing the use of homology models for identifying lead drugs, discloses "[p]roblems still exist, however: the fitting together of protein domains in a multi-domain protein, the determination of the most likely conformation of protein loops, the correct positioning of amino acid side chains, flexible ligand docking - to name only a few" (p. 25, middle).

The quantity of experimentation needed to make or use the invention based on the content of the disclosure: While methods for generating atomic coordinate data of variant polypeptides were known in the art at the time of the invention, it was *not* routine to generate the atomic coordinates of any molecule or molecular complex as broadly encompassed by the claims.

In view of the overly broad scope of the claims, the lack of guidance and working examples provided in the specification, the high level of unpredictability as evidenced by the prior art, and the amount of experimentation required, undue experimentation is necessary for a skilled artisan to make and use the entire scope of the claimed invention. Thus, applicant has not provided sufficient guidance to enable one of ordinary skill in the art to make and use the claimed invention in a manner reasonably correlated with the scope of the claims. The scope of the claims must bear a reasonable

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correlation with the scope of enablement (*In re Fisher*, 166 USPQ 19 24 (CCPA 1970)).

Without sufficient guidance, determination of having the desired characteristics is unpredictable and the experimentation left to those skilled in the art is unnecessarily, and improperly, extensive and undue. See *In re Wands* 858 F.2d 731, 8 USPQ2d 1400 (Fed. Cir, 1988).

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

**[13]** Claim 1 is rejected under 35 U.S.C. 102(b) as being anticipated by Armistead et al. (US Patent 5,978,740).

Claim 1 is drawn to a computer comprising a processor in communication with a memory; said memory having stored therein (i) at least one atomic coordinate, or surrogates thereof, from Table 5 for each of the following residues: His-538, Lys-540, Trp-414, or Leu-491 of a Polo-box domain or atomic coordinates that have a root mean square deviation of said coordinates of less than 3 Å; and (ii) a program for generating a three-dimensional model of said coordinates.

In accordance with MPEP 2111.01, claim 1 has been broadly, but reasonably interpreted as a computer comprising as few as a single x, y, or z atomic coordinate – or

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substitutes thereof – from Table 5 of only a single atom of each of H538, K540, W414, and L491 of a Polo-box domain or atomic coordinates that have a RMSD of less than 3 Angstroms, and a program for generating a 3-D model of said coordinates.

Armistead et al. teaches a computer comprising: (a) a machine readable data storage medium comprising a data storage material encoded with machine-readable data comprising the structural coordinates of Figure 1, (b) a working memory, (c) a central processing unit, and (d) a display, wherein the components of (a) to (d) are “interconnected by a conventional bidirectional system bus” (columns 7-9, particularly column 7, line 65 to column 8, line 18). Armistead et al. teaches the machine-readable data storage medium is encoded with a set of machine-executable instructions, wherein the recorded instructions are capable of displaying a three-dimensional representation of the macromolecule having the structural coordinates of Figure 1 (column 21, line 67 to column 22, line 4). The structural coordinates of Figure 1 of Armistead et al. include atomic coordinates for a nitrogen atom of a His residue (see Figure 1 A-4, atom 222), atomic coordinates for a nitrogen atom of a Lys residue (see Figure 1 A-3, atom 143), atomic coordinates for a nitrogen atom of a Trp residue (see Figure 1 A-10, atom 576), and atomic coordinates for a nitrogen atom of a Leu residue (see Figure 1 A-5, atom 272). The atomic coordinates of the His, Lys, Trp, and Leu of Armistead et al. as noted above are considered to be substitutes of “at least one atomic coordinate of Table 5” for each of H538, K540, W414, and L491, respectively. This anticipates claim 1 as written.

***Claim Rejections - 35 USC § 103***

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The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

**[14]** Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over Armistead et al. (US Patent 5,978,740) in view *In re Gulack* 217 USPQ 401 (Fed. Cir. 1983) and *In re Ngai* 70 USPQ2d 1862 (Fed. Cir. 2004). See MPEP 2144 and 2144.04 regarding the use of legal precedent as a source of rationale supporting a rejection under 35 U.S.C. 103.

In *Gulack* and *Ngai*, the respective Courts held that nonfunctional descriptive material in a claim does not distinguish the prior art in terms of patentability. The key factor in analyzing the obviousness of these claims over the prior art is the determination that the machine-readable data storage medium is known and is unmodified. If the difference between the prior art and the claimed invention as a whole is limited to descriptive material stored on or employed by a machine, it is necessary to determine whether the descriptive material is functional descriptive material or nonfunctional descriptive material. According to MPEP 2106.01, "functional descriptive material" consists of data structures and computer programs which impart functionality when employed as a computer component. (The definition of 'data structure' is 'a physical or logical relationship among data elements, designed to support specific data manipulation functions' and that "[n]onfunctional descriptive material" includes but is

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not limited to music, literary works, and a compilation or mere arrangement of data” (emphasis added). In this case, there is no evidence of record that the atomic coordinate data of Table 5 imparts functionality to the recited computer when employed as a computer component and thus, the atomic coordinates of Table 5 have been considered to be an arrangement of data and thus are considered to be “non-functional descriptive material.” According to MPEP 2106.01, “USPTO personnel need not give patentable weight to printed matter absent a new and unobvious functional relationship between the printed matter and the substrate.” As there is no evidence of record that the atomic coordinate data of Table 5 imparts “a new and unobvious functional relationship” between the data and the computer, the atomic coordinate data of Table 5 have been accorded no patentable weight.

Armistead et al. teaches a computer as noted above.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention for the computer as taught by Armistead et al., wherein only the nonfunctional descriptive material of Table 5 is additionally present in the claims, which does not distinguish the claimed computer from Armistead et al. according to *In re Gulack* and *In re Ngai*. See also Case 2 of Annex 3: Comments of the USPTO at pp. 63-64 of the Trilateral Project WM4 Comparative studies in new technologies, Theme: Comparative study on “protein 3-dimensional (3-D) structure related claims”.

### **Conclusion**

[15] Status of the claims:



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Claims 1-38 are pending.

Claims 2-38 are withdrawn from consideration.


Claim 1 is rejected.

No claim is in condition for allowance.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David J. Steadman whose telephone number is 571-272-0942. The examiner can normally be reached on Monday to Friday, 7:30 am to 4:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kathleen Kerr can be reached at 571-272-0931. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



David J. Steadman, Ph.D.  
Primary Examiner  
Art Unit 1656